Intention based modelling of organisational change: an experience report

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Abstract. *The traditional approach to information systems development has proved to be too monolithic for dealing with highly complex, multidimensional, organisational change issues. In the traditional paradigm, little attempt is made in understanding how the proposed system relates to other organisational components or the effect that the system will have on the enterprise itself. This lack of knowledge ramifies throughout the system development process, making it difficult to identify organisational needs and constraints, to determine viable system solutions, or to evaluate alternatives. This paper puts forward an intentional framework whereby, intention based modelling provides the basis for both understanding and supporting organisational change and helping the development of information systems supporting the organisation. Application of the framework is demonstrated through the use of parts of a large industrial application concerning the re-organisation of a European electricity company.*

1. INTRODUCTION

Over the past decade, continuous challenges have been made to traditional business practices. Rapid market changes such as electronic commerce, deregulation, mergers, globalisation and increased competition have led to a business environment that is constantly evolving. These causal forces manifest themselves in the need for on one hand, *integration* of both business processes and support systems and on the other hand, *externalisation* of business practices. At the same time organisations also experience the effects of the integration and evolution of information technology. While information systems continue to serve traditional business needs such as co-ordination of production and enhancements of services offered, a new and important role has emerged namely the potential for such systems to adopting a supervisory and strategic support role. These developments offer opportunities for changes to organisational structures and the improvement of business processes.

In order to remain competitive, enterprises have been forced into reactive patterns of change. In such an unstable environment information system developers are challenged to develop systems that can meet the requirements of modern organisations. The paradigms of Business Process Reengineering and Business Process Improvement contrast with traditional information system development that focused on automating and supporting existing business processes [Guha, *et al* 1993]. Now, enterprises should create -entirely- new ways of working to survive in a competitive environment. In this context, *enterprise knowledge modelling* can help understanding the current business situation [Jarzabek and Ling 1996] and establishing a vision of what the future should be like Therefore, modelling of enterprise knowledge becomes a pre-requisite for system requirements elicitation and system development [Barrett 1994].

The term 'enterprise knowledge modelling' refers to a collection of conceptual modelling techniques for describing different facets of the *organisational domain* including operational (business processes, structures and work roles, flow of information etc), and teleological (purposes) considerations [Bubenko 1994]. Existing enterprise knowledge modelling frameworks [Bubenko 1994; Dobson *et al* 1994; van Lamsweerde *et al* 1995; Yu and Mylopoulos 1996], stress the need to represent and structure enterprise knowledge. However, very few approaches investigate the dynamic aspect of knowledge modelling; i.e., how enterprise knowledge models are generated and evolve and how reasoning about enterprise knowledge can guide the change process. To this end, this paper puts forward an intentional framework known as the EKD-CMM[1] approach. EKD-CMM is the confluence of two technologies: *Enterprise Knowledge Modelling* and *Process Guidance*.

This work has been realised in the ELEKTRA project which aims to discover generic knowledge about change management in the electricity supply sector for reusing it in similar settings. Two end-user applications have been considered within the project (the first one for 'distribution restructuring' and the other one for 'human resource management'). The common theme underpinning their requirements is their need to deal with change in a controlled way which would lead to an evaluation of alternative options of possible means to meet the objectives for change.

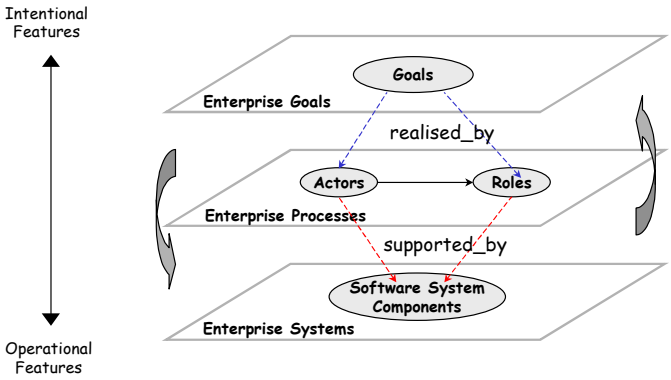

Figure 1: Enterprise modelling views in EKD-CMM

The EKD-CMM enterprise knowledge modelling component expands on our earlier work [Kardasis and Loucopoulos 1998; Kavakli and Loucopoulos 1998; Loucopoulos, Kavakli, *et al* 1998; Nurcan, *et al* 1998 ; Rolland, Grosz, *et al* 1998 ; Rolland, Nurcan *et al* 1998], which recognises that it is advantageous to examine an enterprise from multiple perspectives. As shown in figure 1, the inter-connected set of EKD-CMM models describing an enterprise can be visualised in three levels of concern: *Enterprise Goal Model*, *Enterprise Process Model* and *Enterprise Information System Model*. The first two levels focus on *intentional aspects of the enterprise* i.e., the organisational objectives and how these are operationalised through the co-operation of enterprise actors. The third level, is used when the EKD-CMM approach is applied to define the requirements for an information system. In this case, the focus is on *system aspects* i.e., the computerised system that will support the enterprise goals, processes and actors defined in the previous levels.

The term 'process guidance' concerns the process followed by change engineers in order to deal with organisational change in the *change management domain*. Work on process guidance is based on the process modelling paradigm in the software engineering field [Curtis, Kellner, *et al* 1992; Dowson 1994; Lonchamp 1993]. Research in this area mainly focuses on

[1] The term EKD-CMM stands for Enterprise Knowledge Development-Change Management Method

prescriptive models that enforce rules and behavioural patterns, which, if followed, would lead to the desired process performance. Process enforcement tries to ensure a specific sequence of tasks during the process. However, due to its social, creative nature organisational change cannot be fully prescribed. To this end, process guidance does not dictate which task should be performed next, but provides a set of applicable tasks that can be dynamically selected depending on the enactment context of the process [Grosz, Rolland, *et al* 1997; Pohl 1996; Rolland, Grosz *et al* 1998; Rolland and Plihon 1996 ; Rolland, Nurcan *et al* 1997a ; Rolland, Nurcan *et al* 1997b]. Process support in EKD-CMM is based on the notion of a *methodology road map*. This road map contains a panel of method-specific *intentions* as well as associated *strategies* for achieving these intentions. The map is a navigational structure which supports dynamic selection of the intention to be achieved as well as the appropriate satisfying strategy thus, providing a flexible tool for guiding change processes.

This paper is organised as follows. Section 2 introduces the intentional framework for modelling organisational change. The framework comprises of a set of modelling components for describing intentional enterprise knowledge, as well as a number of intentional strategies for reasoning about enterprise knowledge when managing organisational change. Section 3 discusses methodological issues in using the intentional framework and demonstrates one such approach with the use of an industrial case study. Section 4 concludes the paper with a set of observations on our experiences with the use of the approach.

2. A FRAMEWORK FOR THE INTENTION BASED MODELLING OF ORGANISATIONAL CHANGE

2.1. Overview

EKD-CMM is a systematic approach to developing and documenting enterprise knowledge, helping organisations to consciously develop schemes for implementing changes, which do not necessarily concern the development of computerised systems. Indeed, the decision to develop a software system forms part of the *derived* solution that meets stakeholder needs. Organisational change concerns the transition from an initial `As-Is` organisation situation, which is unsatisfactory in some aspect, to a desired `To-Be` situation where the problem is treated. Both the future state and the possible change routes that can be followed to reach this state have to be specified. To this end, organisational stakeholders develop hypotheses (termed *scenarios*) as to the nature of the desired solution. Scenario formulation is based on the systematic specification of *change goals* and their causal relationships on the basis of: (a) current state goals, (b) stakeholder intentions and (c) contextual forces. The confluence of these three components results in a set of change goals which are presented in a *change goal model*. This model is subsequently utilised for the definition of alternative scenarios. The appropriateness of a proposed scenario may depend on a number of criteria (termed *evaluation goals*), such as `implementation costs`, `efficacy` of proposed transformation, etc. Such criteria cannot be known in advance but need to be defined within the context of the particular change application. Therefore, it is possible to make the distinction between four types of *enterprise knowledge models* with respect to organisational change, namely:

1. knowledge about the *existing enterprise goals* and how they are achieved through the current enterprise behaviour (`As-Is` model);
2. knowledge about the desired enterprise situation, i.e., *future enterprise goals* and how they are achieved by the re-engineered enterprise behaviour (`To-Be` model);
3. knowledge about the stakeholders' *change goals* and how they can be satisfied in terms of alternative change scenarios (`Change-Process` model); and
4. knowledge about the stakeholders' *evaluation goals* with respect to the appropriateness of alternative scenarios for change (`Evaluation` model);

These four types of intentional knowledge correspond to four distinct states within the organisational change 'life-cycle': (1) the As-Is state; (2) the To-Be state; (3) the alternative scenarios for change determined state; and (4) the alternative scenarios evaluated and one selected state. Thus, managing organisational change in EKD-CMM is seen as the systematic progression through the four change states. This progression is based on reasoning about the four types of intentional knowledge. However, EKD-CMM does not prescribe a unique way-of-working in order to reach the four change states, rather it suggests a number of alternative ways-of-working integrated by the use of: (i) a common set of concepts for describing intentional knowledge regarding the four change states, i.e., the EKD-CMM organisational ontology (presented in section 2.2) and, (ii) a methodology road-map and associated guidelines for assisting user navigation within the space of the possible routes to reach the four change states (presented in section 2.3).

2.2. The EKD-CMM Organisational Ontology

Modelling organisational change in EKD-CMM is achieved through the modelling of *enterprise goals* that determine the enterprise strategy and the *enterprise processes* that collaboratively operationalise these goals (see figure 1). In particular, the EKD-CMM enterprise goal model uses a 'network' of goals to express the causal structure of an enterprise, in terms of the *ends-means* relations from the 'intentional' objectives that control and govern the system operation to the actual 'physical' enterprise processes available for achieving these objectives and the enterprise systems that support these processes. The EKD-CMM enterprise process model represents the behavioural aspects of an organisation in terms of the roles that are played by enterprise actors in order to meet the organisational goals, and the dependencies between these roles. Using the EKD-CMM ends-means links, change in enterprise goals (regarding for example, company objectives, policy, general market condition) will propagate top-down as reasons or requirements for re-organising the enterprise processes. On the other hand, changes in the physical basis of the enterprise (e.g., technological advances, improved ways of working), will propagate bottom-up, indicating how new operational conditions affect the organisational objectives.

2.3. EKD-CMM Road map and Guidelines

As mentioned in section 2.1 there are several routes that can be followed in order to reach the four states required for managing organisational change. Each route characterises a specific way of working to solving the problem at hand. Thus, a route consists of a number of method-specific intentions that have to be satisfied in order to solve a particular problem (i.e., reach a desired change state). These routes form a *road map*. A road map is a process model in which a non-deterministic ordering of intentions and strategies has been included. It is a labelled directed graph with intentions as nodes and strategies as edges between intentions. As shown in figure 2, a map consists of a number of *sections* each of which is a triplet $<I^2_i, I_j, \mathbf{S}^3_{ij}>$. There are two distinct intentions called Start and Stop respectively that represent the intentions to start navigating in the map and to stop doing so. We advocate that change processes are intention-oriented, i.e., at any moment, change engineers act in order to fulfil an *intention*. To take this characteristic into account the road map identifies the set of intentions that have to be achieved in order to solve the problem at hand. There are two key intentions in EKD-CMM, namely 'Conceptualise Enterprise Process Model' and 'Elicit Enterprise Goal Structure'. 'Conceptualise Enterprise

[2] Intentions are in regular (I_i)

[3] Strategies are in **bold** ($\mathbf{S_{ij}}$)

Process Model' refers to all activities required to construct a enterprise process model whereas 'Elicit Enterprise Goal Structure' refers to all those activities that are needed to identify enterprise goals and their relationships.

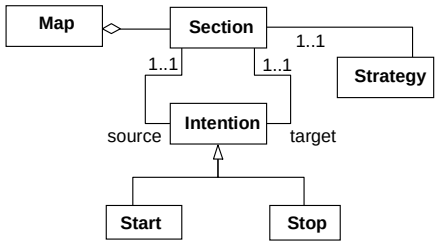

Figure 2: The map meta-model

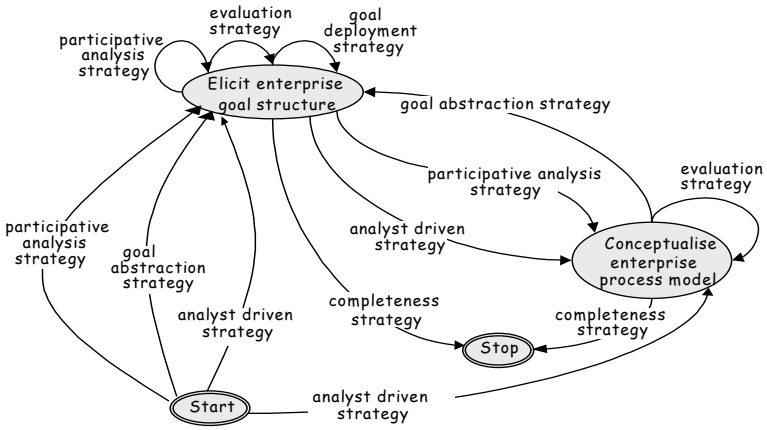

Figure 3: The EKD-CMM road map

A *strategy* is an approach, a manner to achieve an intention. The strategy, as part of the triplet $<I_i, I_j, S_{ij}>$ characterises the flow from I_i to I_j and the way I_j can be achieved. Six strategies are used in the road map for organisational change, namely **Participative Analysis Strategy, Analyst Driven Strategy, Goal Abstraction Strategy, Goal Deployment Strategy, Evaluation Strategy** and **Completeness Strategy.**

The EKD-CMM road map is shown in figure 3. It contains thirteen sections connecting the four EKD-CMM intentions. As shown in figure 3, there might be several flows from a source intention to a target intention, each corresponding to a specific strategy. In this sense the map offers *multi-thread flows*. There might also be several strategies from different intentions to reach an intention. In this sense the map offers *multi-flow paths* to achieve an intention. Finally, the map can include reflexive flows. The road map is a *navigational structure*, i.e. it allows the change engineer to determine a route from Start intention to Stop intention. It contains a finite number of routes, each of them prescribing a way to develop the product, i.e. each of them is a process model. Therefore the map is a *multi-model*. It embodies several process models, providing a multi-model view for modelling a class of processes. None of this finite set of models is recommended 'a priori'. Instead the approach suggests a dynamic construction of the actual path by navigating in the road map. In this sense the approach is sensitive to the specific situations as they arise in the process. The next intention and satisfying strategy are selected dynamically by the change engineer among the several possible ones offered by the road map. Application of selected strategies is facilitated by the use of *guidelines* associated to each map section. A guideline provides a description of the process that should be followed by process participants in order to carry out a particular strategy.

3. APPLICABILITY OF THE EKD-CMM FRAMEWORK IN ELECTRICITY DE-REGULATION

The work presented in this section is part of an industrial application that concerns deregulation of a large European electricity company, with particular focus on the company's Distribution unit, responsible for the delivery of electricity to consumers and the merchandising of electricity services. This company has one of the biggest customer bases in Europe with 6 million customers. It has an installed capacity of 9500 MW and has 35000 employees. Currently it operates as a total monopoly (for production, transportation and distribution) and is owner of energy resources. However, in anticipation of the opening of the European electricity market, the company needs to re-design its business structure, in order to increase its

competitiveness and retain its market share. This is especially critical in the Distribution unit, which is the interface of the company with the final customer. The implications of these forces on this organisation is that any reform, requires, prior to designing new business processes and support information systems, a clear understanding (and a sharing of this understanding between many stakeholders) of the current enterprise situation. However, within Distribution there was a lack of up-to-date documentation describing how business processes are currently being performed or what were the objectives that resulted in this way of operation. With the Distribution services having officially remained unchanged over a very long period of time, corporate memory about the rationale for the way that Distribution functioned, had been lost. This situation provided the context within which a particular way-of-working was adopted.

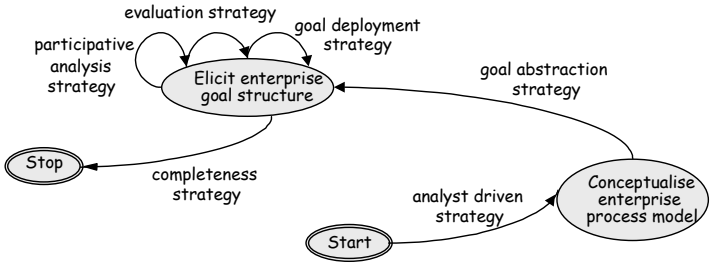

Figure 4: A suggested route for change management

This way-of-working corresponds to one of the possible routes accommodated in the EKD-CMM road map (called the *reverse analysis* route). This route begins by discovering the current situation before proceeding to defining the possible transformation options. In terms of the EKD-CMM road map, this route is highlighted in figure 4 and detailed in table 1. In the remainder of this section we describe each of the tasks illustrated in figure 4 giving also a brief account of the results.

Table 1: Overview of suggested EKD-CMM route for managing change

MS1 -	<Start, Conceptualise Enterprise Process Model, **Analyst Driven Strategy**>
	Produces a description of current enterprise processes.
MS2 -	<Conceptualise Enterprise Process Model, Elicit Enterprise Goal Structure, **Goal Abstraction Strategy**>
	Abstracts the hierarchy of current enterprise goals from current enterprise process descriptions.
MS3 -	<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Participative Analysis Strategy**>
	Deliberates on existing problems as well as future needs thus, identifying future enterprise requirements.
MS4 -	<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Goal Deployment Strategy**>
	Analyses the impact of future requirements on the hierarchy of current goals thus producing alternative scenarios.
MS5 -	<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Evaluation Strategy**>
	Evaluates alternative scenarios incorporated in the change goal hierarchy.
MS6 -	<Elicit Enterprise Goal Structure, Stop, **Completeness Strategy**>
	Reverse analysis completed.

3.1. Discovering the *As-Is* state (map sections MS1, MS2)

As shown in figure 4, the first step in this route constitutes the discovery of the existing organisational state (i.e., reaching the *As-Is* state). This is performed in a descriptive manner, whereby knowledge about the current organisational goals is abstracted from current practice. This was implemented by navigating the EKD-CMM road map following the sections: MS1-<Start, Conceptualise Enterprise Process Model, **Analyst Driven Strategy**> and MS2-<Conceptualise Enterprise Business Process Model, Elicit Enterprise Goal Structure, **Goal Abstraction Strategy**>. Following the guidelines

encapsulated in the road map, first the conceptualisation of current enterprise processes was carried out by EKD-CMM analysts, using a number of knowledge sources including interviews with business experts, completed questionnaires, domain literature, documentation of existing systems, etc. The result was a set of models for over 150 business processes documented in terms of Actor/Role Diagrams, Role/Activity Diagrams, etc.. Second, the goals realised by existing processes were abstracted from the process descriptions thus, establishing the connection between the current enterprise purpose and behaviour [Kavakli and Loucopoulos 1998]. A partial view of the overall Distribution goal hierarchy is graphically represented in figure 5. Leaf goals in this hierarchy are operational goals corresponding to specific enterprise processes. Higher-level goals were abstracted from these operational goals based on their intentional affinities.

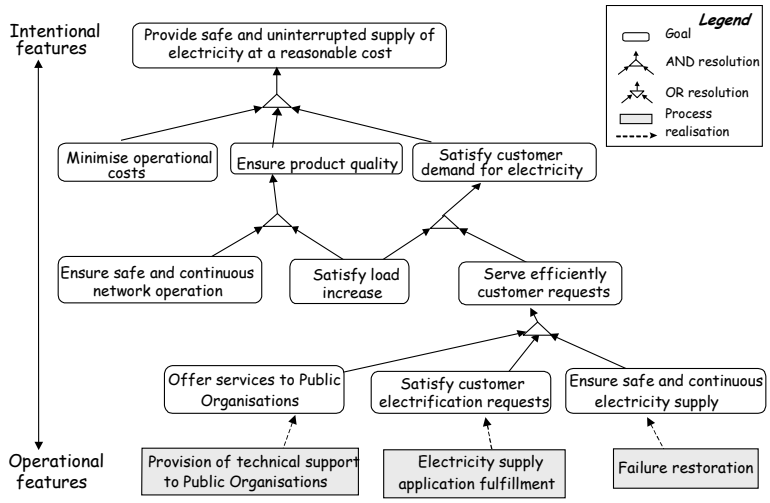

Figure 5: Current Distribution goal hierarchy

Figure 5 demonstrates how different processes collectively support the realisation of higher-level goals. For example, the 'electricity supply application fulfilment' and the 'failure restoration' processes both (ultimately) support the enterprise goal to 'serve efficiently customer requests'. The two processes respond to different types of requests and are serviced by different Distribution departments; as such they have been described as different processes by Distribution personnel. However, modelling of enterprise goals revealed that they both are components of the same macro-process, which deals with customer servicing.

3.2. Identifying To-Be requirements (map section MS3)

Reaching the To-Be state was conducted in a participative analysis approach as indicated in the map section MS3-<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Participative Analysis Strategy**>. This resulted in the specification of both internal enterprise needs as well as external constraints that defined the future enterprise requirements. Future enterprise requirements establish the enterprise vision in terms of where the enterprise wishes to be in the future. The participative analysis strategy is based on the premise that the future vision is not pre-existing in the minds of business analysts but needs to be formulated through deliberating and negotiating with organisational stakeholders. The benefits of the approach lie in the face-to-face *exploration* of current problems and future needs with the aim of developing a shared understanding of the issues involved. Identifying future Distribution requirements presented a number of problems stemming primarily from: (a) the uncertainty of the future situation, and (b) the different perceptions that different

Distribution personnel had on the issues for change.

In order to facilitate the acquisition of future Distribution requirements, we employed a co-operative approach which gave the ability to participants to (a) loosely define and rationalise issues regarding the future situation, (b) refine and categorise future requirements, (c) prioritise requirements through a variety of voting procedures, (d) analyse interdependencies between the requirements, (e) hinder dominant participants so that they did not adversely affect the outcome. The whole process was assisted by the use of Ventana GroupSystems© [Ventana-Corporation 1994] (see figure 6). GroupSystems is a suite of team-based decision software tools that were used for the identification, elaboration and resolution of requirements. By engaging in such activities the participants managed to agree on a number of critical issues relating to the future of Distribution. The identified requirements were extensively discussed and rationalised in a process that necessitated several sessions involving both strategic and operational Distribution personnel.

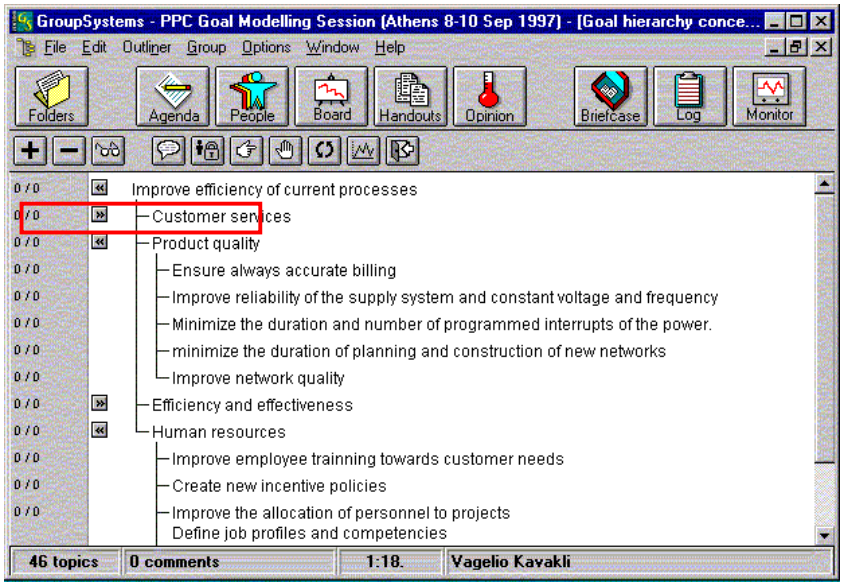

Figure 6: Refining future Distribution requirements with GroupSystems

3.3. Modelling alternative scenarios for change (map section MS4)

Having discovered the existing enterprise situation and identified future requirements, the next step in our route was to identify the effect of future requirements on the current organisational structure thus providing a basis for a reasoned approach for future improvement. This corresponded to the road map section MS4-<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Goal Deployment Strategy**>, which suggests a goal deployment strategy [Loucopoulos, Kavakli, *et al* 1998]. Application of this strategy resulted in the identification of alternative change scenarios indicating the type of organisational transformation necessary for satisfying future requirements, thus reaching the alternative scenarios for change determined state.

The goal deployment approach focuses on the analysis of the impact of future requirements on current enterprise goals. To illustrate this, let us consider the future Distribution requirement 'improve customer services' highlighted in figure 6. Servicing its customers is not a new goal for Distribution. Indeed one of its current high-level goals is to 'serve efficiently customer requests'. Thus, satisfycing of the future goal 'improve customer services' will impact the way the current

goal 'serve efficiently customer requests' is realised. In particular, Distribution personnel identified two types of impact: to *improve/adapt* the current way of realisation or to *introduce* a new intelligent front desk. These two alternatives 'improve current practices' and 'introduce intelligent front desk' are two *alternative* refinements of the future requirement 'improve customer services' and are thus, modelled as alternative branches in the Distribution change process model illustrated in figure 7. Each of these branches denote an alternative change scenario namely, Scenario (A) 'introduce intelligent front desk' and scenario (B) 'improve current practices'.

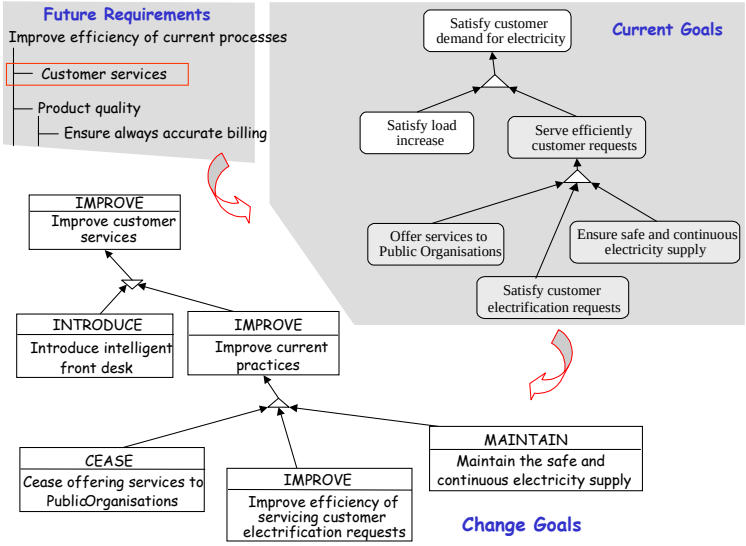

Figure 7: The Distribution change process model

3.4. Evaluating alternative scenarios (map section MS5)

Selection of an optimal change option is carried out through comparative evaluation of alternative scenarios within the change process model. Scenario evaluation in our route corresponded to the map section MS5-<Elicit Enterprise Goal Structure, Elicit Enterprise Goal Structure, **Evaluation Strategy**>, which led to the last organisational state alternative scenarios evaluated and one selected. Reaching this state signified the end of the reverse analysis route as shown by the final section MS6-<Elicit Enterprise Goal Structure, Stop, **Completeness Strategy**>.

Comparative evaluation of alternative change scenarios in the Distribution case was performed in co-operative sessions based on a number of evaluation goals identified by Distribution personnel. During these sessions participants were asked to mark each scenario with respect to each evaluation goal in a nominal scale from Very Low to Very High. Before the actual voting, a discussion took place in order to clarify the meaning of evaluation goals. The result of the evaluation of the scenario (A) 'introduce intelligent front desk', introduced in figure 7, is illustrated in figure 8.

There were a number of problems attributed to the evaluation of alternative scenarios. First, there was no single evaluation goal for assessing change scenarios. In fact, change scenarios had to satisfy a number of evaluation goals both qualitative and quantitative in nature including cost, product quality, balance of concerns, etc. Second, different evaluation goals were not equally important. For example, there were cases that product quality was considered more important than cost whilst there were situations that the opposite applied. Finally, there was no clear relation between different criteria. For example, it was not possible to define that product quality weights twice as much as cost, or that productivity of services is

twice as important as the feasibility to deliver services in the given time frame. Thus, a scenario could get a high average marking but still be unsuitable if it was given a low mark with respect to evaluation goals of strategic importance for the organisation. Ranking the evaluation goals with respect to their relative importance proved to be of assistance. In conclusion, both scenario evaluation as well as interpretation of evaluation data was dependent on *subjective judgement* of involved participants. Disagreement between stakeholder judgements was alleviated by the use of voting procedures.

Scenario A:	Improve customer services by introducing intelligent front desk								
Description:	*The change will involve improvement of and where needed, redesign of service processes and supporting IT systems. The implementation comprises introducing customers profiling, minimising delay time to serve an application, offering all means for payment, offering all services at customer premises, introducing all available technologies to communicate with customers, introducing IT solutions for all services.*								
Evaluation Goals	**NA (0)**	**Very Low (1)**	**Low (2)**	**Average (3)**	**High (4)**	**Very High (5)**	**Total**	**STD**	**n**
Feasibility to deliver in the given time frame	0	0	0	1	2	1	16	0.82	4
Added Value	0	0	0	1	2	1	16	0.82	4
Cost	0	0	0	3	0	1	14	1.00	4
Balance of concerns	0	0	0	1	2	1	16	0.82	4
Product Quality	0	0	0	2	1	1	15	0.96	4
Productivity	0	0	0	3	0	1	14	1.00	4
NA = Not Applicable			STD = Standard Deviation				n = number of participants		

Figure 8: Evaluation of Scenario A against evaluation goals

4. CONCLUSION

This paper reports on the use of an intentional framework for modelling organisational change. Current approaches generally view change management as a *top-down* process. Such methods (e.g., BPR) assume that the change process starts with a high level description of the business goals for change. These descriptions constitute a very abstract representation of the future reality at the intentional level. The initial goals are put into more concrete forms during the process, progressively arriving at the specification of the future system requirements that satisfy these goals. Other approaches (e.g., TQM) advocate a *bottom-up* orientation whereby the need for change is discovered through analysis of the current organisational situation and reasoning about whether existing business structures satisfy the strategic interests and concerns of the involved stakeholders. In the first case the goals for change are *prescribed* in the sense that they do not explicitly link the need for change to the existing organisational context, rather they reflect how change is perceived from the strategic management point of view or is codified in the organisation's policies and visions. Such goals do not always reflect reality [Anton 1996]. On the other hand, in bottom-up approaches goals for change are *described* i.e., they are discovered from an analysis of actual processes. However, descriptive goals tend to be too constrained by current practice, which can be a serious drawback especially when business innovation is sought [Pohl 1996].

This paper puts forward an iterative approach whereby the two views are integrated through the use of a flexible framework that can support alternative ways of managing organisational change. A major advantage of the proposed approach is the systematic way of dealing with change in terms of *enterprise knowledge modelling* used with a *process guidance* framework. Whilst the paper illustrates only one of the possible intention driven ways-of-working for change management, we believe that the practical problems that we experienced during the Distribution application are not specific to the chosen

route but highlight significant issues that affect the application of a large number of knowledge modelling strategies. Indeed, the application of the analyst driven strategy has highlighted a number of issues that are specific to expert-driven strategies regarding the partnership between method and business experts. In a similar way the application of the participative analysis strategy turned the attention into a number of complex issues with respect to the application of participative strategies such as stakeholder commitment and co-operation. Finally, the application of the evaluation strategy gave us useful insights in the complexities of obtaining and interpreting evaluation data. These issues have been used to revise and enhance the guidelines provided by the EKD-CMM road map.

The benefits for the studied company for having used the method presented in this paper are the following : (a) The systematic and guided search for alternative manners to achieve a change goal, being either an improvement, an extension of an existing goal or the introduction of a goal was very positive. Indeed, it helped the stakeholders to envisage innovative solutions ; (b) Because the goal deployment strategy uses as input the As-Is state, the stakeholders were able to point the impacts of the change they proposed on the existing processes ; (c) Using the output of the goal deployment approach, the change model process, the stakeholders were able to carry out an informed evaluation of the alternative scenaria for change to select the most appropriate one. The experience gained during this study has substantiated the view put forward in section 2.3 that the route to be followed as well as its application in a particular change project is very much dependent on the enactment context of the project. Indeed the selection of the reverse analysis route was influenced by the uncertainty regarding both the current Distribution situation and its possible re-organisation alternatives. Moreover, application of the specific strategies forming this route was greatly affected by a number of situational factors including:

1. *organisational culture*, e.g., organisational actors that were not used to working in groups in a participative way, felt awkward in such a situation and found it difficult to contribute as intended;
2. *ability to commit resources*, e.g., the quality of the knowledge models largely depended in the participation of the 'right' people both in terms of business experts and method experts;
3. *social skills and consensus attitudes of participating actors*, e.g., conflicts between individuals and groups within the project increased the complexity of the situation;
4. *use of software tools* to facilitate the process execution, e.g., the use of group support technologies in participative sessions increased both productivity and the quality of results obtained; and
5. *familiarity with applied strategies and supporting technologies*, understanding, among project participants, of the capabilities and limitations of the strategies and tools applied was vital in order to make the best use of them and to produce useful results.

The implication of these empirical observations is that the change management process cannot be fully prescribed. Even when one follows a certain strategy the situational factors dominating the project may cause a number the adaptations to this strategy. This fact strengthens the position advocated by the EKD-CMM road map that in order to support the execution of change processes flexible guidelines are more relevant than rigid rules. For example, the second application that takes place in a Scandinavian country used a different route of the road map including some common strategies as participative modelling but completely excluding the analyst driven. Thus, EKD-CMM provided a systematic, nevertheless flexible, way to organize and to guide the change management and resulted in the expression of reusable knowledge tailored to the change management.

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